Light and Lighting

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The Future of Public Lighting

THE announcement (see p. 154) that street lighting is to come under the supervision of the Ministry of Transport will be noted with great interest.

The technical problems involved in providing good public lighting are great, but the administrative difficulties are certainly equally formidable. It has long been apparent that some form of central supervision is needed.

What form will this administration take and what results will ensue?

The Ministry assumes responsibility at a difficult moment. It should not, therefore, be too severely blamed for the fact that its first advice in regard to street lighting is to do without it—at least after midnight.

This is a passing phase thought necessary in the interests of economy (though the possible fuel saving is probably minute).

One notes with satisfaction, however, the assurance that efforts will be made to eliminate present anomalies and inequalities. If the Ministry utilises existing machinery and available expert knowledge wisely, there is much that it can do in the near future to bring about better conditions

The Future of Street Lighting

Official Notice from the Ministry of Transport

The Ministry of Transport has now become the central authority responsible for street lighting and has taken over from the Home Secretary the allocation of iron, steel, and timber needed for street lighting equipment.

The Minister asks that special consideration should be given in the future to securing reasonable uniformity in lighting standards, and draws attention to the fact that the diversity of lighting standards adopted by lighting authorities on adjoining lengths of roads has, in the past, been a source of danger and inconvenience to road-users. The Minister also expresses the hope that as soon as practicable lighting authorities will do their best to adopt the appropriate recommendations of the Report of the Departmental Committee on Street Lighting, 1937.

As from the date of the circular, the Minister will issue any necessary authorisation under the Defence Regulation 56A for street-lighting schemes, except in so far as streets on new housing sites or streets other than public highways are concerned, which come within the province of the Minister of Health and the Secretary of State for Scotland

Attention is drawn in the circular to the fact that, owing to the serious coal situation, there is still need for the utmost economy in the consumption of fuel for street lighting. During last winter the consumption of fuel was voluntarily restricted by lighting authorities to less than half that of pre-war, and a similar restriction must continue during the coming winter. It is suggested that it is preferable that fuel should be saved by turning out street lights at midnight wherever practicable rather than by reducing reasonable standards of lighting or by turning out alternate lights on a road. Attention is also drawn to the fact that there is still a considerable shortage of gas-mantles, which will probably continue for some time. When a number of Departments have to take action in a specific case, one application on the part of the lighting authority will be sufficient.

The I.E.S. Code

The Illuminating Engineering Society have now reprinted the "I.E.S. Code for the Lighting of Building Interiors." This code was published in its original form in 1936 and has since been in great demand by all who are interested in the adequate lighting of homes, factories, offices, and public buildings. It will be recalled that the 1945 edition contained several important new features, such as the provision of a scientific background on which values of illumination are based, the inclusion for the first time of information on natural lighting, and the introduction of clauses relating to *quality* of lighting (absence of glare, etc.). The edition now available is essentially the same as that issued in 1945 and embodies only minor alterations of layout, etc. Copies, price one shilling and sixpence, may be obtained from the Illuminating Engineering Society, 32, Victoria-street, London, S.W.1.

Illuminating Engineering Course in Glasgow

We learn from Mr. F. M. Hale that, as a result of the course arranged last winter at the Stow College, Glasgow, 11 students sat for the City and Guilds Intermediate Examination in Illuminating Engineering, of whom eight were successful—certainly a creditable result in the circumstances. This course is to be repeated next winter at the Stow College (School of Engineering, Shamrock-street, Glasgow), and will take place on Friday evenings (7.30-9.30 p.m.). The fee for the course is only ten shillings. Enrolment will take place on the opening night, September 27. Any readers interested should get in touch with Mr. F. M. Hale (Lighting Department, 20, Trongate, Glasgow) or make application direct to the Stow College.

The Colour Group: Forthcoming Meeting

We learn that a meeting of the Colour Group is to take place at the E.L.M.A. Lighting Service Bureau (2, Savoy-hill, London, W.C.) at 3.30 p.m. on October 3. Two short papers will be presented by Mr. N. E. G. Hill, who is associated with the Royal Aircraft Establishment, Farnborough. The first of the lectures deals with the Recognition of Coloured Light Signals near the limit of visibility and describes statistical tests on 73 colours. It appears that yellow-orange is the least satisfactory colour group for signals of low illumination. To prevent confusion, a modification of the specification for "aviation white" is proposed. The second contribution deals with the measurement of Chromatic and Achromatic Thresholds of Coloured Point Sources against a White Background. Tests were made on white, yellow, red, and green point source signals, observed against a white background, the brightness of which was varied within wide limits. Here, again, it is concluded that yellow is a comparatively unsatisfactory colour at both very low and very high background brightnesses. This meeting will doubtless be of considerable interest to some I.E.S. members, whose presence will be welcome.

American I.E.S. Convention

Further data now available regarding the above Convention held in Quebec during September 18-20 suggest that some of the 28 technical papers to be presented should be of considerable interest. This applies particularly to the group of papers dealing with "Quality Lighting in Schools" and allied problems, and to those concerned with store lighting.

Illuminating Engineering in Australia

We have received from Mr. A. C. Pearce, Acting Chief Lighting Engineer for the Industrial Welfare Division of the Commonwealth Department of Labour and National Service, interesting evidence of the importance now being attached to good lighting in Australia. Copies are furnished of three publications recently issued by the Department, and dealing respectively with Industrial Lighting, Factory Planning (Part I.), and Colour in Industry; also a draft of a treatise on Natural Lighting of Industrial Buildings, in which British and American practice are reviewed. Other publications are in prospect, including a supplement to the brochure on Factory Planning (Part II.) and more specialised treatises dealing with lighting conditions in the printing and textile industries. It is most encouraging to observe the issue of such literature by a Government Department, which has also had the enterprise to appoint a lighting engineer to advise on such matters. Under the auspices of the Department a series of lecture-demonstrations entitled "Lighting and Colour in Industry" are being staged. The programme covers a wide field and the two lecturers responsible are Mr. A. C. Pearce and Mr. R. J. Alexander. From another source we have also received some illustrations showing the application of fluorescent lighting in factories devoted to war work. For these we have to thank Mr. H. A. Purdie, who during the war served as illuminating engineer to the Ministry of Munitions (Australia) and is now associated with Claude Neon Lights (Victoria), Ltd.

A.P.L.E. Conference

In our next issue we hope to deal with the Conference and Exhibition of the Association of Public Lighting Engineers, which took place during Sept. 10-12, at the Central Hall, Westminster. The programme included papers on "Public Lighting Administration" (Mr. E. C. Lennox), "The Public Lighting Engineer" (Mr. Ronald Parker), and "Street Lighting from the Motorist's Standpoint" (Mr. Edward Fryer). In addition an address was delivered by the incoming President (Mr. W. N. C. Clinch). The exhibition, also staged at the Central Hall, comprised nearly 40 exhibits. The programme also provided for a motor tour of inspection of lighting installations, the annual luncheon at the Connaught Rooms, and visits to Watson House and the G.E.C. Research Laboratories. The Association was fortunate in getting the consent of the Minister of Transport, the Rt. Hon. Alfred Barnes, to address members and delegates at the opening meeting and in securing the Rt. Hon. W. S. Morrison as principal guest at the annual luncheon.

I.E.S.: Opening Sessional Meeting

The **Opening Meeting** of the next session of the Illuminating Engineering Society will be held at **6 p.m.** on **Tuesday, October 8, 1946,** at the School of Hygiene and Tropical Medicine, Keppel-street (Gower-street), London, W.C.1, when the new President, Mr. J. S. Dow, will be inducted and will deliver his **Presidential Address.**

The National Illumination Committee

Questions are already being asked with regard to the resumption of the work of the International Commission on Illumination, and at a recent meeting of the National Illumination Committee, the President of the Commission, Dr. N. A. Halbertsma, was present to discuss the possibility of a meeting in the not too distant future. From the discussions which took place then, and at a subsequent meeting of the N.I.C., it seems that the British point of view favours an informal meeting of the Commission in the latter part of 1947, or early in 1948. Such a meeting would not make any formal decisions, but would serve principally as a means for the exchange of information between the lighting engineers of countries which have been cut off from one another during the past six or seven years, and would enable the various national committees to "pick up the threads" in readiness for a formal meeting of the Commission at a later date.

The British National Committee has already taken preliminary steps towards a resumption of international activity by appointing a number of sub-committees to re-start the study of the various subjects which the Commission had under consideration in 1939. These included Light Sources, Daylight, Theatre Stage Lighting, Automobile Lighting, Lighting Practice, Light and Vision, Aircraft Lighting, and Lighting Education. Certain other subjects also being studied were, it was thought, more appropriately dealt with by a sub-committee working under the aegis of the Illumination Industry Committee of the B.S.I. The membership of this committee is identical with that of the N.I.C., but its work is, of course, confined to standardisation. The Mine Lighting Sub-Committee of the N.I.C. has already produced a very comprehensive report, which was noticed in the March number of LIGHT AND LIGHTING. This will be published in full, together with the discussion which took place when it was read at the meeting of the Institution of Mining Engineers, in the Proceedings of that Institution, and there is no doubt that it will form the basis of a very useful report on the subject for discussion at the next meeting of the International Commission.

It may be appropriate to mention here that the Proceedings of the I.C.I. meetings in Holland in 1939 were being printed in Vienna when war broke out. Two volumes, containing the technical papers and reports, were printed off and were distributed by the German National Committee to those countries with which Germany was in communication. It is understood that the copies for the remaining countries (including, of course, Great Britain), are safe and that steps are being taken by the I.C.I. Bureau to complete the distribution. The third volume, containing the minutes of the meetings, international decisions, etc., has not yet been printed, but this, too, will now be published and, in due course, distributed by the Bureau.

The Illumination of Refuge Guard Posts

The Works and Traffic Committee of the Westminster City Council have recently reviewed the methods of lighting the refuge guard posts, 1,200 in number, within the City area. Of these only 40 are internally illuminated, the remainder being of the temporary type erected during the war.

The Committee now advise that all the refuge guard posts in the City should, in the interests of road safety, be of a standard type conforming to the specification given in the recent Report on Traffic Signs of the Ministry of Transport Departmental Committee*. The work of conversion and installation is expected to be completed within a period of two years.

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* See LIGHT AND LIGHTING, April, 1946.

A Method of Plotting Isolux Curves

By J. G. HOLMES, A.R.C.S., B.Sc., F.I.E.S.

Any calculation of the distribution of illumination will involve some form of the "point-to-point" method for dealing with the direct illumination, even though the illumination by light diffused after reflection at the surrounding walls or ceiling may be calculated by some form of the "lumen" method and added to the direct illumination. There are many methods of reducing the laborious arithmetic associated with direct calculation of point-to-point illumination, and this note describes one which has been found useful for dealing with a large installation of lighting units which may be spaced irregularly and which may have an asymmetrical distribution of intensity. The method is limited to a uniform mounting height above the working plane.

The basic theorem is that the horizontal illumination at any given test point in the working plane from a number of similar light sources at constant height is equal to the sum of the illuminations which would be produced at test points vertically below each light source from a single light source, of the same type, situated at the same height above the given test point. This may be readily proved and is not restricted to regular spacing of the light sources or to symmetrical distributions, although it is necessary that units with asymmetric distributions should all be mounted with their principal beams parallel to each other.

It is necessary to have a plan drawing of the installation, and to know the mounting height and the intensity distribution of the lighting units. The isolux curves, which are the contours of constant horizontal illumination on the working plane, of a single unit are first drawn on tracing paper, using the same linear scale and mounting height as the plan drawing. There are several simple graphical ways of doing this, and the one recently described by Goodbar (Illuminating Engineering, Jan., 1946, p. 39) is convenient for determining the radial distance in plan from the lighting unit to each isolux contour. Anyone who habitually makes these calculations may have a method of his own, or may have a set of standard isolux curves for the different units with which he has to deal, in which case it may be easier to redraw the plan of the installation to the standard scale. The

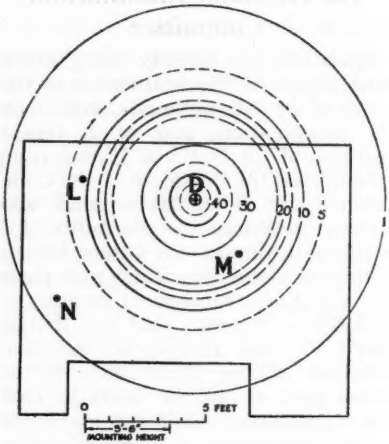


Fig. 1. Tracing of isolux curves superimposed on plan of installation.

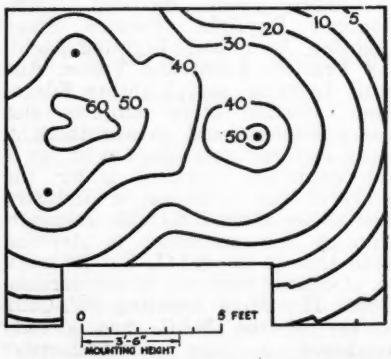


Fig. 2. Isolux curves for the installation.

graphical method used by the author is described in the appendix, but a combination of Fig. 1 in Goodbar's method with the lower part of Fig. 3 in the appendix would be an improvement.

The tracing of the isolux curves of a single unit is laid on the plan of the installation, with its centre over the point at which the total illumination is required, and the illumination values at the positions occupied by each lamp on the plan are noted. These are added, and the sum is the total illumination at the given point from the whole installation. The process is repeated for other points until sufficient is known to enable the isolux contours to be drawn. If the intensity distributions are asymmetrical, the tracing must be so oriented that the main beam of the single unit is in the opposite direction to those of the installation.

As an example, Fig. 1 shows a plan of a room with three symmetrical units, L, M and N, on which a tracing of the isolux curves from a single unit has been laid. The total illumination at the point D below the centre of the isolux curves will be the sum of the illuminations indicated at the three units, L, M and N, namely, $8 + 28.3 + 1.7 = 38$ l/ft^2. Summation with the tracing in other positions leads to the isolux curves as shown in Fig. 2. The whole process occupied one hour and five minutes, the first 25 minutes being

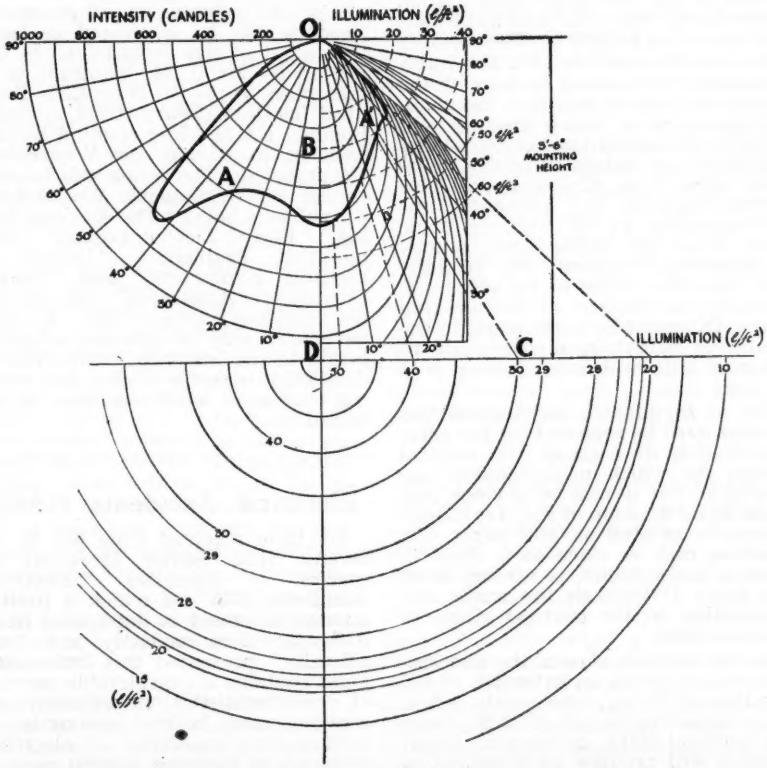


Fig. 3. Graphical method of drawing isolux curves for a single lighting unit.

occupied by producing the isolux curves for the single unit by the method shown in the appendix.

Appendix

A Graphical Method for Drawing Isolux Curves of a Lighting Unit

The vertical polar distribution curve of a symmetrical unit, shown at the top left of Fig. 3, is replotted on a special scale, as shown on the right of the polar diagram. This scale has normal angular spacing, but the spacing of the intensity vectors is modified by the factor $\cos^3\phi$. A series of part-circles, shown dashed, is drawn, the radius of each being the intensity, on the 0 deg. scale, which gives discrete values of the horizontal illumination immediately below the unit at the correct mounting height, h. These values are obviously equal to I/h^2. The intersection of these dashed circles with the distribution curve will give the angular directions at which the unit will produce the appropriate horizontal illumination, and extension of the radial lines along these directions will give intersections on the horizontal line corresponding to the working plane from which the isolux contours may be immediately drawn. The distance, OD, from the centre of the polar diagram, O, to the line of the working plane, DC, must be made equal to the mounting height, h, on the scale of the plan with which the tracing is to be used.

For an asymmetric distribution, this process must be repeated for the polar distribution in each of the vertical planes for which measurements are available, but it will be obvious that if the basic diagram of Fig. 3 is clearly drawn or printed on stiff paper, the drawing may be done on a sheet of tracing paper which is turned about the point D through the angle corresponding to the vertical plane of measurement.

In the example shown, the distribution curve shows an intensity of 600 candles at 32 deg. (see points A,A^1). For a mounting height of 3.5 ft. above the working plane, an intensity of 367 candles will produce an illumination of 30 l/ft.^{2} immediately below the unit and the dashed circle for this illumination is therefore drawn through the appropriate point B. This intersects the distribution at A^1 at 32 deg. (note that $600 \times \cos^3 32$ deg. $= 366$) and the extension of this radial line cuts the line of the working plane at C, which is 2.15 ft. in plan from the unit. This is therefore the radius of the 30 l/ft^2 isolux contour for this unit at 3.5 ft. mounting height. The scale of Fig. 3 is drawn at four times that of Figs. 1 and 2 for convenience in printing.

Special Lectures on Illumination

There is a constant demand for short series of lectures on illumination. Readers will be interested to learn that a set of five lectures, to be delivered by Mr. J. M. Waldram, is to take place at the Sir John Cass Technical Institute (Jewry-street, Aldgate, London, E.C.3). The opening lecture will be at 6 p.m. on Wednesday, November 6. The series will be continued on subsequent Wednesdays, the subjects being "The Eye and Seeing," "Recent Electric Lamps," "Illumination Problems," "Design of Lighting Equipment," and "Recent Photometric Apparatus." The fee for the complete course is 10s. Further particulars may be obtained on application to the Institute, from whom a detailed prospectus of day and evening courses of study can also be obtained.

Electrical Accidents (1945)

We have received from Mr. H. W. Swann, H.M. Senior Electrical Inspector of Factories, "Electrical Accidents, 1945," of which a limited number is issued in duplicated form. Although thus modestly and "unofficially" presented this little pamphlet contains a considerable amount of useful statistical information and conveys many helpful lessons in regard to the avoidance of electrical accidents in factories, typical cases of which are illustrated and discussed.

Lighting and Brightness for Selling

In what follows we give a summary of an article of this title reviewing American practice, by K. C. Welsh (*Illuminating Engineering, May, 1946*).

The illuminating engineer and the architect play an important part in the design of shops and departmental stores. Such designs are the result of commercial, aesthetic and scientific skill. The comparative simplicity of the well-designed modern store is not an attempt to create a new style, nor an effort to create "something different," but results simply from the necessity of attracting the attention of the prospective customer. Store lighting is quite different from any other general lighting problem, being, perhaps, more closely allied to stage lighting, except that we have to consider many viewpoints instead of the fixed and directional viewpoint from a theatre seat.

The great variety of materials handled in shops have reflection factors varying from a fraction of one per cent., as in dark fabrics, up to 80 per cent. or more, as with lighter fabrics or goods with specular surfaces such as silverware and electrical appliances. This fact, and the designer's inability to control these important surfaces which reflect the light, makes the problem of shop lighting highly complex. It is the practice in industrial lighting to analyse the task, giving primary consideration to the brightness of the various elements involved and working back from this to the lighting required. Store lighting should be approached in a similar manner, considering *first* the goods which are for sale, and *secondly* the architectural environment, thus deciding the lighting required, instead of, as at present, filling the shop with as much light as possible, judging the results only by readings with a foot-candle meter.

Attraction and Appearance

Attracting attention, perhaps the one factor necessary in shops, is relatively unimportant in most other lighting problems. Attraction first comes into play from an exterior viewpoint, as shops endeavour to attract passers-by into the shops through the medium of display. Once inside, it is necessary that the attention of the prospective customer be attracted first to the goods on sale, secondly to any messages and visual aids to selling, and thirdly to the environment which might psychologically help in promoting sales. Another theory is that objects in the immediate field of vision attract attention almost directly in proportion to the degree to which they are brighter than other objects and surfaces in the immediate field of vision.

The effect of combining these theories would be that the goods themselves would be the brightest objects in view, the actual brightness depending on the reflection factor of the material and the degree of prominence that is required. While the designer cannot control the reflection factor of objects exhibited, he can, where this factor is low, plan an immediate background that has a higher reflection factor. With the great variance in the reflection factors of merchandise and the considerable degree of flexibility required in the layout of a modern shop, the problem becomes quite complex and therein lies the challenge to the profession. It is recommended that goods for which prominence is desired should be two or three times as bright as the remainder of the displayed stock as a whole, which in turn should also be two or three times as bright as the architectural surroundings.

Colour

With regard to the colour of the light, there does not seem to be any single source commercially available that is completely satisfactory as far as the illumination of certain merchandise and of the human complexion is concerned. The warm colour of the incandescent lamp is the most flattering and is of advantage in shops selling primarily to women. On the other hand, an installation entirely of incandescent lamps does, under certain circumstances, have its drawbacks. It is suggested that a very pleasant illumination, both as regards colour and quality, is produced by the

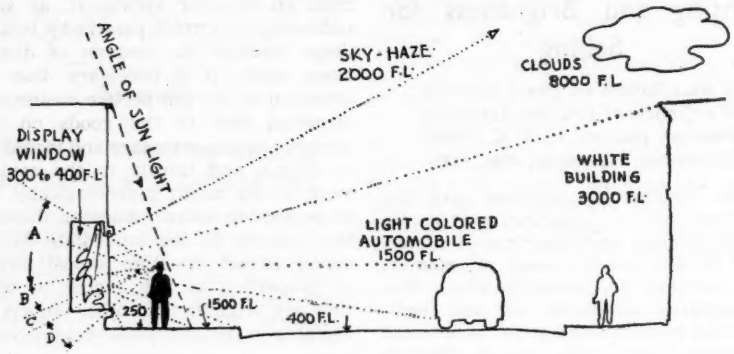


Fig. 1.

use of a combination of indirect fluorescent lamps with direct lighting by incandescent lamps, such direct lighting furnishing from four to eight times the level of illumination provided by the indirect fluorescent elements.

These proportions do not attempt to reproduce exactly all daylight conditions. It is felt, however, that with the lower levels of illumination necessary in artificial lighting some slight exaggerations of some of the relative distributions in nature produce a more dramatic effect. It has been found in appraising a considerable number of samples of materials that the "coolness" produced by indirect daylight fluorescent lamps combined with incandescent sources in the proportions mentioned above produces the best results on the complexion and merchandise as far as spectral distribution is concerned.

Display Windows

The visibility of objects seen through shop windows can be very drastically hampered by reflections in the glass windows and the resultant veiling glare. Enclosing glass, when clean, is a transparent substance the polished surface of which makes it approximately 80 per cent. efficient as a reflector. It is the reflection of light from the surface back towards the direction from which the light is coming that reduces transmission through the glass. When, therefore, we attempt to inspect a surface of a given brightness through this transparent reflector, and when it becomes necessary to look through images of reflected objects of greater brilliancy, such surfaces appear as a luminous fog or what is called "veiling glare." This obviously hampers our ability to see details on the other side of the glass, i.e., in the case of shops, the display of goods in its interior.

It has been established that we reach this condition of "apparent veiling glare" as soon as the ratio of the brightness of the reflected surface to that of the surface being viewed through the glass is unity. The veiling glare is then just apparent, but the general condition is still fairly satisfactory. Any increase, however, in this ratio will result in an increasingly unsatisfactory condition, until, when a ratio of five is reached, the primary function of the display is destroyed. Such a condition can arise when a clear sky or sunlighted surfaces are reflected in window glass, for it is then impossible to create brightness on large enough areas by artificial means to overcome satisfactorily the veiling glare.

"Veiling Glare"

As an indication of these competing brightnesses consider a display window on the shady side of a street where in the daytime skylight alone would produce some 400 to 500 footcandles which may be raised by artificial lighting to 600 to 800 footcandles. With an average

reflection factor of 50 per cent. for the display area this would produce an average brightness of 30 to 400 footlamberts. Yet even with these higher than normal brightness levels reflection of the bright sky and sunlit buildings, which may well constitute exterior brightnesses of over 2,000 footlamberts, is certain to cause harmful veiling glare.

This is illustrated in Fig. 1. Any display within the arcs A and C, with reflecting brightnesses of 1,500 footlamberts and upwards would be obliterated. Within these zones one would only see reflected buildings and the sunlit pavement. Conditions in arcs B and D, on the other hand, would be satisfactory. Add to this picture the reflections of moving people and traffic and even greater confusion would result.

The design of shop fronts thus concerns both the architect and the illuminating engineer, who must thoroughly analyse any given site from all possible angles, taking into account exterior conditions, and must endeavour to eliminate harmful veiling glare by ensuring that only objects of a relatively low order of brightness undergo reflection in the direction of the observer.

School Lighting

In a contribution, reprinted from *School and College Management*, Mr. G. B. Gibbons reviews current codes of practice in regard to school lighting. The Building Regulations (S.R. and O. 345, 1945) specify standards to be complied with in all schools under local education authorities. Further data are to be found in the I.E.S. code and in No. 12 of the series of studies of post-war Building Studies, issued under the aegis of the Department of Scientific and Industrial Research.

Whilst specific recommendations in regard to the planning of natural lighting have been made (which, however, have obviously little bearing on conditions in buildings already in existence), it is difficult to ensure adequate daylight illumination during all periods of the year. It is constantly necessary, therefore, to supplement this by artificial light. From this standpoint the fluorescent tube presents great advantages, as the colour of the light so closely resembles that of daylight. The lamp has other familiar merits, such as the moderate brightness and the good diffusion of the light. Illustrations showing its use in typical classrooms, mounted overhead in lines parallel with the desks, are included in the article.

Light on Cables

During the war Messrs. W. T. Glover and Co., Ltd. (Manchester), found it necessary to use artificial lighting 24 hours a day in some sections of their cable works. The lighting was therefore modernised, and more recently an administration block, including drawing office, process laboratory and test room have been similarly treated. In general 1,000 or 1,500 Metrovick Cosmos lamps in 18-in. dispersive reflectors are mounted in all the main bays, furnishing 12 lumens per square foot. In the rubber cover and braiding departments, however, where mounting heights are limited to 13 ft., 300- and 400-W lamps are used. The new lighting, creating a 610 kW load, greatly improved conditions during those critical years when, in addition to cable work, much effort was devoted to the production of material for "Operation Pluto," by means of which petrol was piped across the Channel during the invasion period.

A view of a section of the works of W. T. Glover & Co. Ltd., Manchester, in which improved lighting has been installed.

Daylight Factor Protractors

Reference was made in the August issue of "Light and Lighting" (p. 141) to the use of protractors developed at the Building Research Station for the purpose of assisting in the determination of daylight factors. H.M. Stationery Office have now issued Building Research Technical Paper No. 28 (price 4d. net), entitled "Protractors for the Computation of Daylight Factors," which gives a detailed description of these protractors which have been devised to simplify the computation of daylight factors and to enable measurements to be made direct from the drawings of a building.

The simple daylight factor protractor used by itself is only applicable to the ideal case of windows of infinite length. In order to deal with the general case of windows of restricted length, auxiliary protractors have been developed which enable correction factors to be determined.

Both types of protractor for various conditions of glazing and also for unglazed apertures are now available and may be obtained from H.M. Stationery Office.

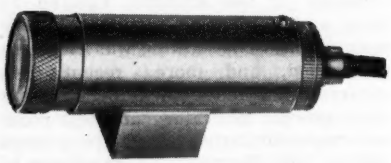
The Life of Fluorescent Lamps

It is understood that the life of the present form of fluorescent lamp is materially affected by frequent switching on and off, since it is during the period of starting that the emissive coating of the filaments is most rapidly exhausted. For example, lamps switched on only once a day will last considerably longer than lamps which are switched on and off at frequent intervals.

It is with interest, therefore, that we note a recent article giving particulars of a circuit which, it is stated, does away with the ordinary starter switch and allows fluorescent tubes to be switched on and off at frequent intervals without serious reduction of life.* A standard choke coil is used to limit the current to the tube, but across the filaments there is a subsidiary circuit consisting of a switch with a suitable resistance in series for reducing the starting current. When first connected the switch may be closed so that the filaments are connected in series across the main supply during the warming up process. When the switch is opened the discharge will strike in the normal way. The discharge is extinguished by closing the switch, the current flowing through the filaments maintaining them in a hot condition ready to strike again immediately the switch is opened. As the filaments never cool down frequent switching does not lead to excessive shortening of life.

A New Miniature Lamphouse

An addition to the range of G.E.C. photoelectric equipment takes the form of a new miniature lamphouse designed to meet the demand for a compact light source suitable for industrial applications where the distance to be spanned does not exceed three feet and where other equipment would be too large or optically unsuitable. This is designed



for use with the G.E.C. MD photocell relay amplifier, and is used with a 12-volt, 6 watt automobile lamp. Telescopic adjustment enables the light beam to be accurately focused and a sharp image produced.

* Elec. Review, August 2, 1946, p. 195.

Atmospheric Weathering Tests on Anodised Aluminium Reflectors

by W. E. HARPER, C. A. MORTON, and P. SMITH

(Trans. Illum. Eng. Soc. (Lond.), August, 1946)

Although, as previously announced, it has been found possible to resume distribution of *Light and Lighting* and ordinary issues of the I.E.S. Transactions to *all* members, the Paper Restrictions do not render it possible to deal in this way with papers of exceptional length.

Accordingly, it has been decided to limit the distribution of the **August (1946) issue** of the Transactions, containing the **contribution by Mr. W. E. Harper, Mr. C. A. Morton, and Mr. P. Smith,** which will be sent to libraries and to such bodies as require the Transactions for permanent reference, but only to those I.E.S. members who make application for it (which all members who are in the habit of retaining copies and binding them in volume form will naturally do).

Members who wish to receive the August issue of the I.E.S. Transactions, which will be available very shortly, are accordingly requested to fill up and return to the Hon. Secretary the attached form.

This form to be returned to the Hon. Secretary of the Illuminating Engineering Society, 32, Victoria Street, London, S.W.1.

I.E.S. Transactions, August, 1946

Please send me the issue of the Transactions for August, 1946, containing the paper entitled "Atmospheric Weathering Tests on Anodised Aluminium Reflectors," by W. E. Harper, C. A. Morton, and P. Smith.

Signature of Member.....

Name and Address
to which copies should be sent. .....

These data are intended for postal use. Names and addresses must therefore be written *clearly in block letters.*

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Lighting Reconstruction Pamphlets

Readers are reminded that copies of the series of Lighting Reconstruction Pamphlets are still available on application to the Illuminating Engineering Society (32, Victoria-street, London, S.W.1).

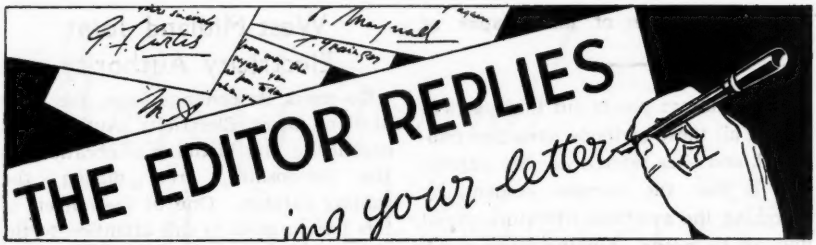
It will be recalled that the first five of the series are all available at the same rate (single copies 1s. each, 9s. per dozen, £3 per 100). The titles are as follows: No. 1, "The Principles of Good Lighting"; No. 2, "The Lighting of Public Buildings"; No. 3, "The Lighting of Schools"; No. 4, "Natural Lighting"; No. 5, "Public Lighting in the City and Highway."

The sixth of the series, "Making Work Lighter," which carries illustrations by Fougasse, is issued at the special flat rate of 6d. a copy.

I.E.S. Convention Special Souvenir Programmes

Apart from the general introductory programme of the Convention, circulated prior to the gathering, all members attending were presented on arrival with a special **Illustrated Souvenir Programme,** containing particulars of the chief events and containing pictures and biographical notes in regard to the leading I.E.S. members and distinguished visitors taking part.

Many of those who were unable to attend the Convention will doubtless wish to have copies of this Souvenir Programme. A supply of these has been furnished to secretaries of Centres and Groups throughout the country, from whom copies are obtainable; or on application to 32, Victoria-street, London, S.W.1.



I have been asked what concessions are likely to be made by the powers that be in regard to **Display Lighting,** especially during the Christmas season. I fear that no general relaxation is likely. The general ban on illuminated signs is to continue, and even the special **lighting of shop windows** for the Christmas trade receives no encouragement.

According to a recent notice in the Press, however, the removal of screens to enable interior lighting to illuminate the windows will be permitted. "For this relief much thanks." Yet is this really a concession at all? The regulations in force during the war permitted 1 watt per square foot to be used for interior lighting, and if some of this light is allowed to fall on the contents of the windows surely no objection could be taken on the grounds of economy.

However, the recognition of this practice favours the method, popular in some of the most modern shops, of **exposing the entire contents of the available area to full view** from the street. And if, in selecting shades for the lamps, some form of translucent material bearing a significant picture or motto is selected, could objection be fairly taken to this? Again, whilst it would doubtless be considered an infringement for light to be specially devoted to the illumination of descriptive signs, surely there should be no objection, in the case of high windows, to the use of a suitable translucent frieze which receives no special light but only the general illumination prevailing throughout the shop area.

A remark in Mr. Allen's recent paper on **"The Basis of Daylight Calculations"** summarised in our last issue (August, 1946, p. 141), seems to have given rise to some discussion. It was remarked that the daylight diagrams have not been made generally available commercially, though it was hoped this would be rectified in the future. In this connection interest attaches to technical paper recently issued by H.M. Stationery Office dealing with protractors. (See p. 164.)

Mr. P. J. Waldram, who has written to us on this subject, states that the only diagrams for measuring daylight used or suggested are:— (1) the reticule described by Mr. Allen, (2) its prototype, consisting of a projection on plan of a hemisphere or of angular co-ordinates, published shortly after the death of Labmbe as the graphical form of his consine law and familiar to scientists for centuries, and (3) transparent and perspective grids for obtaining the day-

light factor values of photographs of visible sky.

Mr. Waldram points out that particulars of all these methods have ben published, and cites references. My impression is that the earnest student, by searching the available literature, could find all he needs. On the other hand, more might perhaps be done, by republication in simple pamphlet form, to make these data more familiar and the various devices more readily accessible.

I continue to receive inquiries in regard to the proposed supplementary **Resettlement Course in Illuminating Engineering,** which has been in contemplation for some time. At the moment of going to press this matter still awaits the decision of the authorities, but it is hoped that it will be settled very shortly. If authorised, this course will be a longer course, extending over nine to ten months, and will probably be held at the Borough Polytechnic, London, S.E.

Traffic Signs for Export

Important production developments to meet home and export demands for traffic signs are announced by the Tube Investments Group. Their traffic sign manufacturing subsidiary company, Gowshalls Ltd., of Walsall, will shortly be moved to new premises at Oldbury, Birmingham, where a new production layout and additional plant is expected to result in a fourfold increase in output.

The company will also undertake the manufacture of a number of additional accessories connected with traffic regulation and street lighting.

West Midland Joint Electricity Authority

To mark its coming-of-age, the West Midland Joint Electricity Authority is organising 21st birthday celebrations in the Shropshire area during the coming autumn. One of the objects of this campaign is to call attention to the progress of electricity in the West Midlands and to point out what it has done and is doing to further the interests of industrial and rural areas.

Ripple Control at Magnet House

Those interested in the remote control of either street or shop lighting, of water heaters or of two-part tariff meters should make a note of a new publication—"G.E.C. Sys tem of Centralised Control." The system described in this brochure is based on electronic remote switching control without switch wires. Alternating currents of musical frequencies between 300 and 800 C.P.S. are injected into the supply mains and operate tuned relays at the points to be controlled. Those who wish to see a demonstration of the system should apply to the Exterior Lighting Dept., Magnet House, Kingsway, London, W.C.2.